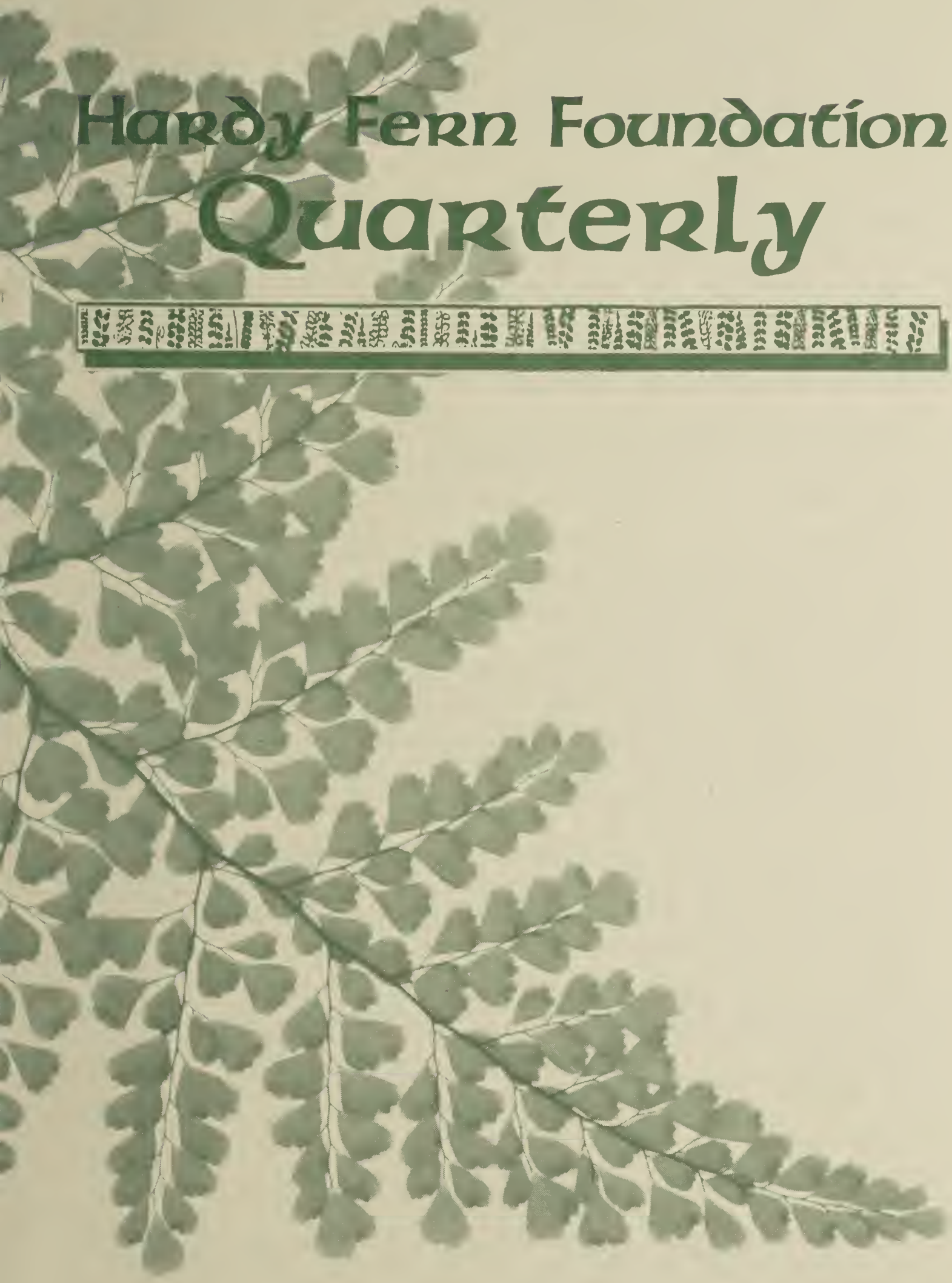
Hardy Fern Foundation Quarterly



THE HARDY FERN FOUNDATION

P.O. Box 166

Medina, WA 98039-0166

Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Stephen Austin Arboretum, Nacogdoches, Texas, Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, Sacramento, California, Coastal Maine Botanical Garden, Boothbay, Maine, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens. Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Inniswood Metro Gardens, Columbus, Ohio, Lewis Ginter Botanical Garden, Richmond, Virginia, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Bainbridge Island Library, Bainbridge Island, WA, Lakewold, Tacoma, Washington, Les Jardins de Metis, Quebec, Canada, University of Northern Colorado, Greeley, Colorado, and Whitehall Historic Home and Garden, Louisville, KY.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

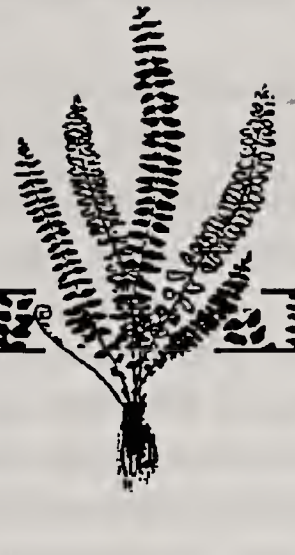
Cover Design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

THE HARDY FERN FOUNDATION

QUARTERLY

Volume 12 • No. 3 • Editor - Sue Olsen



The Spore Exchange Needs You!

Please continue to send spores to:

Shannon Toal
9843 41st AVE SW
Seattle, WA 98136

President's Message

We are all saddened by the recent passing of Marshall D. Majors on 5/28/02. A past member of the Board of Directors of the Hardy Fern Foundation, he was a true gentleman and an avid gardener. We all have benefited from his wisdom and sharing of ideas. He will be sorely missed.

The Fern Festival has just concluded with an increase in sales and attendance in excess of 16% over last year, a banner year itself. The lecture by Richie Steffen concerning the Elisabeth Miller Garden was very stimulating and well attended with a capacity crowd.

The second annual workshop on propagation added more interest and increased attendance on Saturday morning. There seems to be an increasing enthusiasm for the use of ferns in landscape plantings.

As in the past the Festival would not have been possible without the dedicated help of Northwest Horticultural Society members Karin Kravitz, Janet Warford, Ann LeVasseur and Richard Hartlage and Hardy Fern Foundation members Sylvia Duryee, Sue Olsen, Lyman Black, Rob Leitner, Michelle Bundy, Katie Burki, Becky Reimer, Deirdra Plunkett, Nils Sundquist, Guy Huntley and especially Willanna Bradner with her outstanding graphic art.

We all had a good time even though hard work was involved. Success is our reward.

Godspeed to those members who will be participating in the Mid-Atlantic Fern Foray Tuesday July 9, 2002 through Saturday, July 13, 2002 and a big thank you to member Jack Schieber for organizing it all. What a wonderful opportunity to meet some of our members and see gardens far removed from our familiar natural habitat. I hope this trip will mark the beginning of similar forays in the future.

We always encourage input - articles and news of happenings throughout the country which may help others to be successful fern gardeners.

Thank you again for your help and generosity.

Best regards,
Pat Kennar
President

DRYOPTERIS INTERMEDIA - Evergreen Wood Fern

James R. Horrocks,
Salt Lake City, Utah

Dryopteris intermedia

Also known as the Fancy Fern, this species is a very hardy denizen of eastern North America, being one of the most common of Wood Ferns. It has formerly been known as *D. spinulosa* var. *intermedia*. It frequents moist, shaded woods and even swamps and is found on rocky slopes, the soil being slightly acid to neutral. It may also be found inhabiting dryer sites among rocks. *D. intermedia* is often confused with *D. carthusiana* (*spinulosa*), *D. campyloptera*, and *D. dilatata*. Two characteristics set it apart from these other close relatives. First, it exhibits minute glands resembling hat pins on the lower surface of the fronds, especially along the rachis and costa. Secondly, the innermost pinnule of the basal pinnae is shorter than the adjacent outer pinnules. In similar species, the innermost pinnule of the basal pinnae is longer. This species freely hybridizes with a number of species including *D. cristata*, *D. celsa, D clintoniana, D. goldiana,* and *D. marginalis*. It crosses with *D. expansa* to produce *D. campyloptera* and back crosses with *D. campyloptera.* It is also believed to be one of the parents of *D. carthusiana.* Obviously this represents a large complex of closely related species and hybrids. *D. intermedia* ranges from subarctic eastern Canada to eastern Minnesota and Wisconsin down through North Carolina and Georgia and across to eastern Missouri, Illinois and Iowa. It is disjunct in Glacier National Park, Montana.

Description: The rhizome is a distinct crown which forms the previous season well above the soil surface, and produces a vase-like cluster of fronds. The fertile fronds are the first to appear, the somewhat smaller sterile fronds appearing later. The basal pinnae are a diagnostic aid in identification since the longest pinnule is the second from the rachis on the basioscopic side. The stipe is two-thirds the length of the blade with light brown scales bearing a medial dark stripe. The fronds are fully evergreen from 12 to 36 inches long, bipinnate-pinnatifid to tripinnate. The pinnae are mostly at right angles to the rachis with pinnules that are spiny-toothed (spinulose) at the margins. The lower pinnules of the basal pinnae are longer than the upper ones. The kidney-shaped sori lie near the base of the segments midway between the midveins and the spiny-tipped margins. The frond, especially the lower part, is covered with minute, capitate clear glands and the medial indusia exhibits similar glands. These can be seen with a 10-power hand lens. Cytological studies confirm this species to be diploid and as has been mentioned, it freely hybridizes with a number of other species.

Culture: *D. intermedia* is a rather easily grown fern, making a strong growing specimen plant but also beautiful in mass plantings.

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New England Wild Flower Society Celebrates The Year of the Fern"

— Elizabeth Farnsworth

The New England Wild Flower Society, despite its name, is not just about charismatic angiosperms. We have been concerned with the conservation and promotion of ferns and their allies for most of our 101-year history. A foray into our archives reveals a rich history of writings and activities regarding ferns. Time spent perusing these fragile, yellowed pages also gives fascinating insights into a changing society and the resilience of species.

Tucked into one scrapbook, for example, is a 1901 leaflet written by the eminent botanist, George E. Davenport, "A Plea for the Preservation of Our Ferns." This essay was among the very first leaflets produced by our progenitor, the nascent Society for the Protection of Native Plants. The Society's early mission — much as it is today — was to "educate the community in regard to the importance of preserving from destruction our beautiful wild flowers and ferns, for the adornment of nature and the enjoyment of all who love the beautiful wherever found..." Davenport wrote at the close of the Victorian Era, when the public's fascination with nature was at its height and when amateur and professional botanists discovered and captured the biological diversity of the new world through intense collecting of specimens. Ferns were wrested from their wild habitats to festoon private gardens, fill out herbaria, and adorn bouquets. Unfortunately, our enthusiasm for ferns was causing them to disappear from the landscape. Davenport spelled out the problem urgently:

"...the Osmundas, the ostrich fern, and some of the shield ferns are in greater danger of being exterminated on account of the more exposed condition of their rootstocks and frond-buds, and as they are among the most useful and showy of our native ferns they should be protected in every possible way."

Davenport lamented that the royal fern (*Osmunda regalis)* was almost extirpated from England by zealous collectors, while "the *Woodsias*, spleenworts, the bladder ferns and the oak ferns [were] becoming extremely rare" here in the northeast. Davenport implored fern-lovers to restrict their collecting to late in the season when the next year's croziers had been set, and to leave the rootstock intact. With this practical advice, we could be assured that "the plants themselves will continue to live as long as the habitats remain in existence." Davenport's phrase was prescient; today, of course, the Society recognizes the implications of protecting not only ferns but their surroundings.

By 1904, 40,000 of the Society's leaflets had been distributed, and word was getting out. John C. Kimball, writing for Connecticut's *Sharon Advocate*, noted that the Society's objective was "to check the wholesale destruction to which many of our native plants are exposed...It does not aim to discourage the moderate and artistic gathering of ferns and flowers, but only that which is wasteful and thoughtless." Invoking the poetry of Emerson and Tennyson, Kimball called on all who loved nature to join in the work of the Society, to educate children and adults about plants, and to promote an appreciation for them in their environs, not just in vases. Along with the

recently-formed Audubon Society, which advocated the protection of birds from similar reckless hunting, the Society for the Protection of Native Plants was one of the earliest voices for environmental awareness in the United States. The American Fern Society and the British Pteridological Society, both founded in the early 1890's, also joined the clamor.

By 1910, the imperative toward conservation was even stronger, as ferns were being systematically harvested at a huge scale for use in floral displays. According to the *Pittsfield Journal* of western Massachusetts, there were some 50 million ferns in cold storage at one facility that employed hundreds of workers to poach them from the Berkshire mountains. The *New York Times* documented in 1914 that over 60 million ferns were imported to New York City alone to supply the florist trade, hand-picked from the wild in August to October by migrant laborers. As ferns became less common, however, the law of diminishing returns and an emerging ethic would push both hobbyists and industries to develop methods for propagating desirable ferns, much as the Hardy Fern Foundation has done.

Over the decades, ferns have bounced back, some from the brink of extinction. However, while it is less common to lose ferns to over-collecting today, many species are

Goldie's fern, *Dryopteris goldiana*, is found from Quebec to Alabama, but is listed as rare in many states and provinces. One of the largest ferns in North American, it grows in rich moist woodland soils (and throughout Garden in the Woods). Photo by New England Wild Flower Society/ Lisa Matthei.

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New England Wild Flower Society Celebrates "The Year of the Fern" *continued from page 65*

The pond shore at Garden in the Woods is home to no less than six species of ferns: cinnamon fern (*Osmunda cinnamomea*), royal fern *(Osmunda regalis* var. *spectabilis*), interrupted fern *(Osmunda claytoniana*) marsh fern *(Thelypteris palustris* var. *pubescens*), lady fern *(Athyrium filix-femina*) and sensitive fern (*Onoclea sensibilis*). Photo by New England Wild Flower Society/ Elizabeth Farnsworth.

increasingly threatened by habitat destruction. It is fitting that, as we head into our second century of existence, the New England Wild Flower Society celebrates 2002 as the Year of the Fern. We are calling attention to the diversity, rarity, and unique biology of ferns through a series of exciting events. Our award-winning display highlighted ferns at the New England Flower Show in March. Nine field trips and workshops will focus on identifying and growing ferns this summer, with more to come throughout the year. We are producing comprehensive conservation and research plans to protect rare ferns and allies in New England, including the Green Mountain maidenhair fern, *Adiantum viridimontanum.* Our recent annual retreat for Board members and Overseers featured a tour of fern diversity and had us peering through microscopes at spores. Our Garden in the Woods is home to dozens of fern species, and welcomes visitors. And watch for our upcoming magazine issue, dedicated to a range of articles spanning the fabulous 500-million year past and present of ferns. With the continued work of all admirers of ferns, the next century will see these plants flourish.

The NEWFS annual publication Conservation Notes a 40-page magazine will feature The Year of the Fern when published this fall. The magazine is included with membership or can be ordered separately.

Upcoming Field Trips and Classes

held at the New England Wild Flower Society's botanical garden, Garden in the Woods, 180 Hemenway road, Framingham, MA:

Propagating Native Ferns Workshop
Saturday, July 27, 9am-12noon and held again on August 3 2002
taught by Susan Dumaine

Ferns of Bartholomews Cobble
July 28, 12:30-3:30pm
Meet at Bartholomew's Cobble, directions provided with registration

Hop Brook Ferns and Flowers
Saturday, August 3, 11am-2pm
taught by Ted Elliman, botanist
Meet at Hops Brook, directions will be provided with registration

Native Ferns Propagation Workshop
August 3, 9am-12noon

Meet at Norcross Wildlife Sanctuary, directions provided with registration
Become a Plant Conservation Volunteer Corps member.
Contact Brandon Mann at 508-877-7630 x 3204 for more information.

Design Inspirations from New England landscapes with Laura Eisner
August 25, 2002, 1:30pm
1 hour gardening series lecture, free with admission to Garden in the Woods.

For contact information for education:
cdodd@newfs.org this email connects with our course registrar, Cathy Dodd
or phone 508-877-7630 x 3207 for fees and updates on availability.

Dryopteris Intermedia *continued from page 63*

Its sturdy evergreen fronds are particularly desirable. It is happy in a moist shaded woodland garden and is particularly striking near boulders. The soil should be rich in humus, slightly acid to neutral, and stony. This fern can take deep shade but is also tolerant of some sun. The soil should be kept moist at all times and well mulched. It is extremely cold tolerant and is best in temperate climates. It is short-lived in the extreme south.

References:

The Fern Guide, (1961) Edgar T. Wherry, Double Day, New York.

A Field Guide of the Ferns and Fern Allies of the United States and Canada, (1985) David B. Lellinger, Smithsonian Institute Press, Washington, D.C.

Fern Growers Manual, (2001) Barbara Joe Hoshizaki and Robbin C. Moran, (Revised), Timber Press, Portland

Ferns to Know and Grow, (1984) F. Gordon Foster, Timber Press, Portland

Tales of the Lady in Red

William Cullina,
Nursery Manager and Propagator for the New England Wild Flower Society

Northern lady fern
Athyrium filix-femina

Lady fern (*Athyrium filix-femina*) is one of the most wide spread ferns in the world, growing happily in the temperate and tropical regions of the Americas as well as in Europe and Asia. I find it amazing how certain ferns have attained such a far-flung natural distribution until I remind myself that they have been at the game for a very, very long time. Not surprisingly, this very cosmopolitan fern has responded to the rigors and opportunities of various regions by evolving into five distinct varieties. In North America, the Southeast, Northeast, Northwest and Southwest all have their own forms of lady fern, each a bit different in small ways, but all recognizable as one species.

Our tale begins in the Northeast – for our purposes here, a region stretching roughly from Manitoba to Newfoundland then south to the Tidewater region of Virginia and west to the foothills of the Rocky Mountains. Here in this relatively cool to cold and moist part of the continent grows the northern lady fern (*Athyrium filix-femina* var. *angustum*). It is one of the most common ferns in New England, growing typically in moist, shaded forests, floodplains, and swamp margins. Northern lady fern relishes damp, fertile soils but it is rarely found in either flooded, mucky places or seasonally parched ground. However, should the summer turn unusually dry, this adaptable species simply retires underground until its fortunes change for the better. The plants produce deciduous fronds with a delicate constitution and soft green color. By delicate I mean both their physical fragility (the fronds are easily broken if handled roughly), and their graceful appearance. The blade forms a broad ellipse narrowed toward the base and tip, this divided not once or twice but three times into narrow, serrated pinnules. Depending on the fertility of the soil and the depth of shade, the fronds range from a medium gray-green to light yellow green in color. The fronds grow from a slowly creeping rhizome studded with the stubs of petioles that do not abscise cleanly from the plant but rather tear away with the ravages of the seasons. Thus, by following back the ragged petiole stubs, it is possible to trace the slow but consistent progress of a plant across the ground. In a favorable spot, the rhizome may creep 2 inches in a season – not enough to be considered aggressive, but adequate to produce a fine 2-3 foot wide patch after several seasons. A healthy plant produces occasional branches from the rhizome that set off in another direction, so gradually the colony can become circular in outline.

In the typical form of the variety, the frond is lofted on a 8-18 inch long, fairly slender petiole roughly as long as the arching blade, giving a mature plant an average height of about 24 inches, give or take 6. Most specimens of *Athyrium filix-femina* var. *angustum* have a light green petiole that colors deep red or brown only where its shaggy base attaches to the rhizome. However, scattered individuals can be easily found with this ruddy pigment infusing most of the petiole, sometimes even running up the length of the rachis of the leaf. In the past, these red-stemmed forms have been called *Athyrium angustum* var. *rubellum* as well as the tongue-tiring *Athyrium filix-femina* var. *angustum* forma *rubellum,* neither of which is recognized by the authors of the *Flora of North America* as valid monikers. Nevertheless, the red-stemmed forms can be very distinctive, and in our garden they not only come true from spore, but typically emerge a week after the typical green forms do in spring.

The New England Wild Flower Society has grown and distributed plants and spore of the red-stemmed lady fern for years that originates from plants growing in our collections at Garden in the Woods, our botanical garden and showcase for 1700 species of native plants. Five years ago, however, John Lynch, one of our long-time members and a very talented gardener, naturalist, and photographer, brought us a particularly fine form he raised from spore for his own garden. It boasted captivating, ruby red stems a shade or two darker and more resplendent than any I had seen before or have seen since. He told me that he discovered the parent plant in Vermont (no doubt while on one of the wildflower photography expeditions he is famous for), and this was the best of a crop of sporelings that resulted from a fertile frond he pocketed in passing. Rather than propagate this special fern through the slow process of rhizome division, I attempted to raise a crop of sporelings that winter. One of the peculiarities of this form is that the anthocyanin pigments that give the stems their evocative color only develop after the plant has endured its first winter, and do not reach their full intensity until the fern is at least two years old and fully mature. Thus, the intrepid propagator cannot cull his or her crop of less colorful individuals for at least a year, and the full splendor of a particularly fine specimen is not evident for at least another season. After two years, though, it became obvious to me that the glistening ruby red of John Lynch's find was one in a thousand – or the way ferns reproduce, maybe one in a million!

In order to distribute this fine cultivar most effectively, I asked Kent Kratz, the tissue-culture wiz at Just for Starters, Inc (which has now been incorporated into Texas-based fern wholesaler Casa Flora, Inc) to try it in tissue culture. Kent had no trouble producing tens of thousands of identical little plantlets, and he even came up with the name "Lady in Red" for this exciting new release. The first "Ladies in Red" began to hit the retail nursery catalogs last fall, and it has met with widespread acclaim (one catalog calls it "the most exciting new hardy fern to hit the market in several years.").

One of the nice things about lady fern is its propensity to keep producing new fronds through the season if the soil remains moist. Come August, most of the plants in our shade gardens are clothed in leaves that look increasingly threadbare after a long spring and summer of photosynthesis. Thus, I especially welcome the fresh spring green of emerging fern fronds to lend a little vernal freshness to the late summer

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Tales of the Lady in Red *continued from page 69*

garden. Since the brilliant red stems of Lady in Red are especially noticeable as the frond first unfurls, this gives yet another dimension of those late season flushes of new growth.

While adequate fertility helps insure a long growing season for "Lady in Red," one thing I have noticed is that the more nutrient rich the soil, the darker red the stems, and, not surprisingly, the darker green the leaves. With ample nitrogen, the stems take on a hue closer to garnet – not quite as luminous, but pretty in its own way. To bring out the best ruby red, place this fern in bright light (a few hours of morning sun or light all-day shade is ideal), and provide moderate levels of nitrogen (a topdressing of compost or some 5-10-5 fertilizer applied sparingly once in spring). As its wide natural range suggests, northern lady fern is an adaptable girl, and it should perform well in gardens through the cooler parts of North America, though I cannot vouch for its performance in the Southeast and Southwest. So please, give this red-legged Vermonter a try, I think you'll be glad you did.

Technical Reference:

Morin, Nancy R. et. al. editors, *Flora of North America, Volume 2.* Oxford, England, Oxford University Press, 1997

BOOK REVIEW BOOK REVIEW BOOK REVIEW

Review by Sue Olsen

SCANDINAVIAN FERNS

By Benjamin Øllgaard
Illustrated by Kirsten Tind
Rhodos, Copenhagen, Denmark 1993
317 pages, 114 Color Plates, 103 Black & White Figures

No, I'm not proposing that the HFF embark on a Baltic Cruise, interesting though that may be, but I am recommending this excellent book (in English by the way) that I recently acquired. It was highly touted by a colleague from the Netherlands and at first I wondered why on earth I needed another fern book (although I'm always interested) none the less one on Scandinavian natives. The answer is in the excellent text and outstanding botanical drawings.

I knew I'd like the book as soon as I read the first paragraph, "Ferns are plants of discreet appearance and modest requirements; they have no showy flowers, and generally lead an unobtrusive existence. However, to the attentive observer they have a special appeal, each species having its own 'personality', be it graceful, delicate, rugged or bizarre. Individual character is usually due to subtly transformed repetition, gradual elaboration or simplification of a basic form of leaf or segment, which create striking patterns of great elegance specific to each species, and convey visual impressions often hard to capture in words"

Mr. Øllgaard's introductory section provides botanical and scientific data as well as four maps showing altitude, mean rainfall, mean cold temperatures and mean warm temperatures respectively. The bulk of the book however is devoted to descriptions of the ferns (69) and fern allies (19 including 9 *Equisetum*). There is an introductory section for each family as well as for every genus giving the characteristics, numbers, growth habits and distribution all enriched by anecdotal commentary on medicinal and ornamental properties. This is followed where appropriate by a key and then information on the individual species organized into the following categories – description, reproduction, variation and relationships, distribution, ecology, names, uses and hybrids. (HFF fern frond emergence students will be pleased to note that frond unfurling data is included). Black and white figures illustrating specifics of the ferns' botanicals such as the traditional and essential presentation of reproductive characteristics accompany the text along with less frequently encountered but helpful details of venation, variation, cross sections of the petiole and species specifics. The result is a very comprehensive and educational presentation tempered with common sense and peppered with personal observations such as this regarding the gourmet qualities of *Matteuccia struthiopteris* fiddleheads.... "Their taste is sometimes compared to asparagus, but I find their shape more attractive than their flavour."

As a result of glaciation Scandinavia has only one endemic fern, *Dryopteris expansa* var. *willeana* confined to the coast of Norway. Not surprisingly the other natives are also to be found in the floras of Europe and the British Isles. I was, however, surprised as well as impressed with the number that are North American's. At one point I intended to count the number of ferns common to us both and then realized that with the exception of several highly ornamental *Aspleniums* and a few of their friends these ferns are ours as well....all the more reason to appreciate the text and the outstanding illustrations.

Finally (and of great significance) if a picture is worth a thousand words, this volume is worth a fortune. There are 114 color plates of incredibly beautiful botanical illustrations by Kirsten Tind. Here are the ferns and their pertinent details. My favorites, however, are her drawings of the ferns in their habitat. Here she pictures the lichens, liverworts, mosses, native wildflowers and even the "weeds". I have an excellent library of fern books and few, if any, have color plates or photos that can compare with the quality of Tind's.

The book measures 10" x 13" - a coffee table book in US parlance. The measure of the book goes far beyond its dimensions, however and I recommend it strongly for education, research, beauty and even if need be on the coffee table for the enlightenment of folks who think all ferns look alike!

I purchased my copy from

Koeltz Scientific Books

PO Box 1360
D-61453
Koenigstein
Germany

www.koeltz.com

Garden Evaluations
2001

Garden Name: Birmingham Botanical Gardens

Genus, Species, Variety or Cultivar	Year Planted	# of Ferns Alive	Average Frond Length (In/CM)	Has It Borne Spore In the Past Year	Garden Worthiness Rate 1-5 Low to High
Athyrium otophorum	1994	2	20"	Yes	5
Adiantum venustum	1996	3	6"	No	3
Blechnum penna-marina	1998	3	9"	No	3
Cyrtomium falcatum 'Rochfordianum'	1998	5	16"	No	5
Cyrtomium fortunei	1998	5	20"	Yes	5
Dryopteris affinis	1996	3	16"	Yes	5
Dryopteris affinis 'Azorica'	1998	4	12"	No	3
Dryopteris x *australis*	2000	3	24"	No	5
Dryopteris championii	1996	3	12"	Yes	3
Dryopteris cristata	1998	2	15"	No	2
Dryopteris cycadina	1995	2	25"	Yes	5
Dryopteris filix-mas 'Undulata Robusta'	1994	2	25"	Yes	5
Dryopteris lacera type	1998	5	25"	Yes	5
Dryopteris lepidopoda	1998	3	9"	Yes	3
Dryopteris pacifica	2000	3	16"	Yes	4

Dryopteris polylepis	2000	3	15"	Yes	4
Dryopteris pseudo filix-mas	1996	4	22"	Yes	5
Dryopteris pycnopteroides	2000	3	12"	Yes	5
Dryopteris sacrosancta	1995	5	20"	Yes	5
Dryopteris stewartii	1998	5	25"	Yes	4
Dryopteris sublacera	1997	3	19"	Yes	4
Dryopteris villarii	2000	2	12"	Yes	4
Dryopteris wallichiana	1995	3	12"	No	2
Osmunda regalis 'Purpurascens'	1994	1	23"	Yes	4
Phegopteris decursive-pinnata	1994	Many	21"	Yes	5
Polypodium interjectum	1998	5	6"	Yes	3
Polystichum falcinellum	2000	2	12"	No	2
Polystichum neolobatum	1998	2	12"	Yes	4
Polystichum setiferum	1997	3	18"	Yes	4
Polystichum setiferum 'Divisilobum'	1994	1	10"	No	4

Growing conditions this past year, including temperature high and low. (approximately) Are there ferns in your garden that received a low rating? If so, what would you say are the reasons? Other comments? In year 2000, Birmingham, AL, experienced warmer and drier than normal weather for the third successive year. The hottest day was 103°F and eight days exceeded 100°F. Such temperatures occur in Birmingham less than once every 25 years. In contrast, it was much colder than normal during the last part of November and the month of December.

Records indicate the period from May 1 to October 31, 2000, was the driest on record for Birmingham. As a result of the severe drought, all outdoor watering was banned, including at the Botanical Gardens where the HFF plants are planted. Consequently, the plants experienced considerable stress. Fortunately, both temperature and rainfall have been average during the spring and summer of 2001.

Garden Name: Coastal Maine Botanical Garden

Genus, Species, Variety or Cultivar	Year Planted	# of Ferns Alive	Average Frond Length (In/CM)	Has It Borne Spore In the Past Year	Garden Worthiness Rate 1-5 Low to High
Adiantum aleuticum	1999	3	19"	Yes	
Ádiantum aleuticum	2000	3	23"	Yes	
Athyrium filix-femina 'Frizelliae'	1999	3	5"	No	
Dryopteris crassirhizoma	2000	3	13"	Yes	
Dryopteris cristata	1999	2	14"	Yes	
Dryopteris lacera affinity	1999	2	17"	Yes	
Dryopteris polylepis	2000	3	16"	Yes	
Dryopteris pycnopteroides	2000	3	11"	Yes	
Dryopteris remota	2000	3	19.5"	Yes	
Dryopteris villarii	2000	2	13"	Yes	
Dryopteris x *australis*	2000	2	17"	No	

NOTE: The following plants are in the HFF fern garden but were acquired from other sources.

Asplenium trichomanes	2001	3	No evaluation this year.		
Athyrium niponicum 'Pictum'	1996	3	11"	Yes	
Polystichum munitum	2000	1	32"	Yes	

Lowest temperature 0°F (Jan. 18); highest temperature 91°F (Aug. 7) These figures are for Rockland, ME, the nearest coastal weather station. Heavy snowfall in winter with late melting. Very dry spring and summer. The fern garden was irrigated.

Doubtless the heavy snow cover and lack of a late spring freeze helped the plants through the winter and the early growing season.

Several ferns had unexplainable small white spots on their fronds. We do not believe that this was insect damage; it may be caused by air pollution, specifically by ozone. We are examining this problem further.

Garden name: Georgeson Botanical Garden

Genus, Species, Variety or Cultivar	Year Planted	# of Ferns Alive	Average Frond Length (In/CM)	Has It Borne Spore In the Past Year	Garden Worthiness Rate 1-5 Low to High
Dryopteris crassirhizoma	1999	1/5	16"	Yes	1
Dryopteris fragrans	1993	1/10	8"	Yes	3
Matteuccia struthiopteris	1996	4/4	36"	Yes	5
Polystichum braunii	1995	8/10	24"	Yes	5

The summer of 2000 was normal except for August which was the coldest on record. Only two days above 70°F, average daily temp. was 59°F. The winter was fairly mild with a minimum of only –25°F and average snowfall. It seems the first 3 years are critical to the success of ferns. If they are well established after 3 years, they usually grow well as long as there is a good blanket of snow or mulch.

Garden name: Harry P. Leu

Genus, Species, Variety or Cultivar	Year Planted	# of Ferns Alive	Average Frond Length (In/CM)	Has It Borne Spore In the Past Year	Garden Worthiness Rate 1-5 Low to High
Dryopteris celsa	1998	3	14"	Yes	4
Polystichum polyblepharum	1998	3	12"	Yes	5
Polystichum setiferum	1998	2	5"	Yes	2
Dryopteris sieboldii	1998	3	12"	Yes	5
Polystichum setiferum	2000	3	9"	Yes	4
Dryopteris pycnopteroides	2000	3	5"	Yes	4
Dryopteris bissetiana	2000	2	3"	Yes	3

Harry P. Leu continued on page 76

Dryopteris polylepis	2000	2	6"	Yes	3
Dryopteris pacifica	2000	3	5"	Yes	4
Dryopteris villarii	2000	3	3"	No	3
Dryopteris lacera	2000	3	10"	Yes	5

Winter was a cool one, 4 nights below 32°F; one at 27°F, one at 28°F, two at 31°F. The past year was dry except we have been receiving lots of rain since June 2001. The warmest it has been is approximately 97°F.

Garden name: Inniswood Metro Gardens

Genus, Species, Variety or Cultivar	Year Planted	# of Ferns Alive	Average Frond Length (In/CM)	Has It Borne Spore In the Past Year	Garden Worthiness Rate 1-5 Low to High
Athyrium filix-femina 'Frizelliae'	1999	3	12"	No	5
Athyrium filix-femina 'Vernoniae Cristata'	1994	3	22"	Yes	5
Blechnum spicant	1999	3	12"	No	5
Cyrtomium macrophyllum	1998	3	10"	No	4
Dryopteris affinis	1996	4	12"	No	3
Dryopteris affinis 'Crispa Barnes'	1998	5	18"	No	4
Dryopteris bissetiana	1999	3	11"	Yes	5
Dryopteris corleyi	1999	2	6"	No	1
Dryopteris erythrosora	1994	4	14"	Yes	5
Dryopteris lacera affinity	1999	3	18"	Yes	5
Dryopteris polylepis	1999	3	14"	Yes	5
Dryopteris pseudo filix-mas	1996	5	20"	Yes	5
Dryopteris pseudo filix-mas	1998	4	18"	No	5
Dryopteris remota	1998	4	11"	No	4

Dryopteris sacrosancta	1995	5	12"	Yes	5
Dryopteris sieboldii	1999	2	5"	No	2
Dryopteris wallichiana	1995	3	20"	No	5
Phyllitis scolopendrium	1994	3	8"	No	4
Polystichum andersonii	1996	5	14"	Yes	5
Polystichum munitum	1999	3	7"	No	3
Pteris excelsa	1995	1	3"	No	1
Thelypteris viridifrons	1995	3	20"	Yes	4

Lowest temp. was –10°. Highest temp was 95°. The weather suddenly turned cold in early October, never warmed up. Then we had a sudden hard freeze in December. In April, we had warm very dry weather. I think the sudden cold and freeze irreparably damaged some plants. In the April drought, some ferns stopped developing. Some picked up when rains came in May, some never caught up. Because of the early cold, we did not plant the 2000 ferns out until Spring. We will report on them next year.

Garden name: Lewis Ginter Botanical Garden

Genus, Species, Variety or Cultivar	Year Planted	# of Ferns Alive	Average Frond Length (In/CM)	Has It Borne Spore In the Past Year	Garden Worthiness Rate 1-5 Low to High
Dryopteris pacifica	2000	3	30 cm	Yes	4
Dryopteris polylepis	2000	3	28 cm	Yes	4
Dryopteris pycnopteroides	2000	3	23 cm	Yes	5
Dryopteris villarii	2000	2	34 cm	Yes	3
Dryopteris x *australis*	2000	3	44 cm	No	3
Polystichum falcinellum	2000	2	15 cm	No	2

The winter lows for Richmond occurred in late December 2000 and early January 2001 when temperatures reached into the low teens, with an absolute low of 12 degrees Fahrenheit. We had an unseasonable, hot, dry two week period in April followed by a drought in the month of July when we received only 2.73 inches of rain for the month and temperatures reached into the upper 90s. The high temperature for the year occurred in August at 98 degrees Fahrenheit, not atypical for summer in Richmond.

Garden name: Rhododendron Species Botanical Garden

Genus, Species, Variety or Cultivar	Year Planted	# of Ferns Alive	Average Frond Length (In/CM)	Has It Borne Spore In the Past Year	Garden Worthiness Rate 1-5 Low to High
Adiantum aleuticum 'Subpumilum'	1990	6	8-10"	Yes	5
Adiantum pedatum	1990	1	28"	Yes	5
Adiantum venustum	1990	Many patches	20"	Yes	5
Adiantum viride-montanum	1990	1	29"	No	4
Arachnoides simplicior var. *major*	1990	4	18"	Yes	4
Asplenium trichomanes		4	6"	Yes	5
Asplenium trichomanes 'Incisum'	1991	4	8"	Yes	4
Athyrium otophorum	1990	5	12-15"	Yes	5
Blechnum cordatum	1999	12	10-36"	Yes	5
Blechnum niponicum	2000	3	5"	No	2-3
Blechnum penna-marina	1993	Many	11"	Yes	5
Blechnum spicant	1990	Many	36"	Yes	5
Blechnum spicant 'Serratum Rickard'	1990	4	22"	Yes	4
Cheilanthes lendigera	?	1	6"	No	2
Cyrptogramma crispa		4	11"	Yes	5
Cyrtomium caryotideum	1991	4	15"	Yes	4
Cyrtomium lonchitoides	1994	8	12"	Yes	4
Cyrtomium macrophyllum	1990	4	20"	Yes	4

Doodia media	1999	12	8-10"	Yes	4
Dryopteris bissetiana	1999	3	6"	Yes	3
Dryopteris blanfordii	1997	7	18"	Yes	5
Dryopteris celsa	1994	3	24"	Yes	4
Dryopteris championii	1990	1	7"	No	3
Dryopteris corleyi	1999	5	15"	Yes	3
Dryopteris cycadina	1990	2	18"	Yes	3
Dryopteris cystolepidota	1994	7	22"	Yes	5
Dryopteris dilatata	1990	3	18"	Yes	5
Dryopteris erythrosora	1990	9	18"	Yes	5
Dryopteris erythrosora 'Prolifica'	1990	3	8"	No	4
Dryopteris expansa		Many	36-48"	Yes	4
Dryopteris filix-mas	1990	2	42"	Yes	5
Dryopteris formosana	1991	7	18"	Yes	5
Dryopteris kashmiriana	1999	7	18"	Yes	4
Dryopteris lacera	1990	1	15"	No	3
Dryopteris lepidopoda	1994	4	24"	Yes	5
Dryopteris ludoviciana	1990	2	8"	No	3
Dryopteris marginalis	1999	13	6"	Yes	2
Dryopteris pacifica	1999	9	15"	Yes	4
Dryopteris polylepis	1990	13	15"	Yes	4
Dryopteris pseudo filix-mas	1990	6	24"	Yes	5
Dryopteris pycnopteroides	1992 & 1999	11	10-15"	Yes	3

Rhododendron Species Botanical Garden continued on page 80

Dryopteris sacrosancta	1996	8	18"	Yes	4
Dryopteris sieboldii	1990 & 1997	11	24" +	Yes	4
Dryopteris stewartii	1998	5	15"	Yes	3
Dryopteris uniformis	1999	11	20"	Yes	4
Dryopteris wallichiana	1999	11	30"	Yes	5
Dryopteris x *australis*	2000	5	20-24"	Yes	5
Gymnocarpium dryopteris	1990	Many	8"	Yes	5
Gymnocarpium dryopteris 'Plumosum'	1990	Many	8"	Yes	5
Gymnocarpium oyamense	1997	3 patches	7"	Yes	4
Hypolepis punctata	1996	1 patch	15"	No	3
Matteuccia struthiopteris	1990	Many	26"	Yes	4
Onoclea sensibilis		Lg. Patch	18"	Yes	4
Osmunda cinnamomea	1997	Many	52"	Yes	5
Osmunda claytoniana	1990	1	14"	Yes	2
Osmunda regalis	1996	Many	48"	Yes	5
Phyllitis scolopendrium	1990	7-10	10-23"	Yes	5
Polypodium interjectum	1998	3	8-10"	Yes	3
Polypodium scouleri	1990	Lg. Patch	13"	Yes	5+
Polystichum acrostichoides	1990	5	14"	Yes	3
Polystichum aculeatum	1990	1	15"	No	3
Polystichum braunii	1990	5	8"	Yes	5
Polystichum californicum	1991	3	7"	No	2
Polystichum falcinellum	2000	1	2"	No	1

Polystichum makinoi	1991	9	12-24"	Yes	5
Polystichum munitum x *andersonii*	1996				
Polystichum neolobatum	1991	4	12"	Yes	5
Polystichum polyblepharum	1990	Many	12-15"	Yes	5
Polystichum retrosopalaeceum	1990	1	24"	?	3
Polystichum tsus-simense	1990	5	15"	Yes	5
Polystichum x illyricum	1990	1	16"	Yes	2
Rumohra adiantiformis	1999	4	3-8"	No	1
Thelypteris decursive-pinnata	1990	Many patches	12-15"	Yes	5
Thelypteris phegopteris	1990	Many patches	12"	Yes	5
Woodsia obtusa	1990	1	Eaten by something	No	Normally a 4 or 5
Woodsia polystichoides	1999	6	5-6"	Yes	5
Woodwardia areolata	1990	Many	9"	Yes	5
Woodwardia fimbriata		1	30"	Yes	5
Woodwardia unigemmata	2000	3	36"	Yes	5

We experienced a very mild fall and winter with temperatures only dipping down to 29 degrees in February. Our average high for November was 40 degrees while our average high in February was 45 degrees. The majority of our Dryopteris collection is beginning to adjust to their newly renovated site in the Upper Woodland Garden. We've amended the sandier soil with organic matter and some of the newly planted trees are beginning to fill out and provide more shade for the ferns.

Garden name: Stephen F. Austin Arboretum

Genus, Species, Variety or Cultivar	Year Planted	# of Ferns Alive	Average Frond Length (In/CM)	Has It Borne Spore In the Past Year	Garden Worthiness Rate 1-5 Low to High
Cyrtomium fortunei 'Rochfordianum'	1998	5	24–28"	Yes	5
Cyrtomium caryotideum	1997	5	12–14"	Yes	3
Cyrtomium fortunei	1997	5	15–18"	Yes	5
Cyrtomium macrophyllum	1997	5	14–18"	Yes	3
Dryopteris affinis 'The King'	1997	2	8–10"	Yes	2
Dryopteris affinis 'Azorica'	1998	3	8–12"	Yes	5
Dryopteris bissetiana	1999	2	10–12"	Yes	3
Dryopteris celsa	1998	3	15–18"	Yes	5+
Dryopteris championii	1997	3	18–24"	Yes	5
Dryopteris clintoniana	2000	2	10–12"	Yes	5
Dryopteris corleyi	1999	2	10–12"	Yes	3
Dryopteris crassirhizoma	1997	1	6–8"	?	1
Dryopteris cycadina	?	3	24"	Yes	5+
Dryopteris erythrosora	?	5	16–20"	Yes	5+
Dryopteris kashmiriana	1999	1	10"	No	1
Dryopteris lacera affinity	1998	4	10–14"	Yes	5
Dryopteris pacifica	2000	3	12–14"	Yes	5
Dryopteris polylepis	2000	2	10–12"	Yes	5
Dryopteris pseudo filix-mas	1997	5	15"	Yes	5

Dryopteris pycnopteroides	2000	3	12–14"	Yes	5
Dryopteris remota	?	5	12–14"	Yes	5
Dryopteris sacrosancta	1997	5	12–14"	Yes	5
Dryopteris sieboldii	1997	3	12"	Yes	3
Dryopteris stewartii	1998	1	14–16"	Yes	4
Dryopteris sublacera	1997	1	12"	No	1
Dryopteris x *australis*	2000	3	15–18"	No	5
Polystichum falcinellum	2000	1	6–7"	No	0
Polystichum polyblepharum	1997	5	12–16"	Yes	5
Polystichum setiferum	1997	3	12–15"	Yes	4

The lowest temperature during the last twelve months was 24 degrees. The highest was 100 degrees with many days over 95 degrees. The biggest problem we had growing ferns in the last few years has been high rainfall during the dormant period and dry hot weather during the growing season. We are moving our fern garden to a new location in the Arboretum. The new location will give us more light and a lot less competition from tree roots. This will be a much better area for ferns.

New Members

Laura Baker

Ned Bromley, Riverby Gardens

Katie Burki, Lakewold Gardens

Wayne Duguay

Jim Engan

Oona Johnsen

Robert P. Letendre

Don Hedden and Louis Wolcott

Gary Osborne

Barbara Sarason

Diane Thompson

THE HARDY FERN FOUNDATION

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Karie Hess (inside design)

**** ATTENTION ALL MEMBERS ****

Now is the time to place your fall fern orders!

Here is our list for fall fern distribution. We have a good supply of all ferns listed but ordering early is always recommended. Ferns will be shipped via UPS the last week of September or the first week of October. Please include with your order a day time telephone number or e-mail address where you can be reached and we will contact you with your exact shipping date. UPS will not deliver to P.O. boxes so please be sure to give us your street address. All ferns are $8.00 each. You will be billed at the time of shipping. **Send your orders to: Michelle Bundy 16038 46th AVE S, Tukwila, WA 98188.** If you have any questions please e-mail Michelle at thebundys5@attbi.com. Thank you for your support!

Dryopteris cycadina
Shaggy Wood Fern
Zones: 5 to 8
Fronds 1 ½ to 3' tall, semi-evergreen
This fern has a dense covering of black scales on the stipe and rachis, giving the stems a striking shaggy appearance. Native to Japan, Taiwan, China and northern India.

Dryopteris clintoniana
Clinton's Wood Fern
Zones: 3 to 8
Fronds 2 to 4 ' tall, semi-evergreen
This large fern prefers a moist spot in the garden. Native to northeastern North America.

Dryopteris pseudo-filix-mas
Mexican Wood Fern
Zones: 5 to 8
Fronds 2 ½ to 4' tall, semi-evergreen
This large, rare fern occurs in moist forests at high-elevations in Mexico and Guatemala.

Polystichum rigens
Zones: 5 to 8
Fronds 1 to 2 ½' tall, evergreen
The glossy, rich green fronds of this fern have spiny tips. A native of Japan.

Thelypteris decursive-pinnata
Japanese Beech Fern
Zones: 4 to 10
Fronds 1 to 2' tall, deciduous
This fern has fresh green fronds and spreads by underground runners. Forms nice clumps and is non- invasive.

THE HARDY FERN FOUNDATION

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